Loss of the Delta's historical landscape as an ecological stressor

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Landscape lost

At the time of the California Gold Rush, tidal wetlands upstream of Suisun Bay occupied about as much area as did the open water and mudflats of San Francisco, San Pablo, and Suisun Bays combined. Together with the Delta's channels, lakes, and natural levees, these Delta wetlands covered an estimated 1400 square kilometers[1, 2].

The Delta's vast marshy plains, served by networks of meandering tidal channels, adjoined gallery forests along the Sacramento River and its distributaries[3], received outflow from riverine flood basins that held ponds and lakes[4, 5], surrounded sand mounds near Isleton and Brentwood[6], abounded in willow-fern swamps along distributaries of the San Joaquin River[7], and graded into the seasonally flooded toes of alluvial fans[8]. The structure of this bygone landscape is becoming clearer through examination of old maps, surveyors' notes, newspaper accounts, travel diaries, and photographs this bygone landscape[8].

Some 20 square kilometers of Delta tidal wetland remained six decades ago[9]. Today, as they did then, the remnants dot dredge-cut waterways.

On assessing ecological stresses from this landscape loss

1. Assume that the near-total disappearance of the Delta's historical landscape abets other stressors, as in the "regime shift" hypothesis[10].
2. Seek clues to ecological functions of the bygone landscape through study of the Delta's historical descriptions[5, 9] and geological deposits[11-13].
3. Look for these functions in restorations that play the country-music song backwards:
   a. Draw analogies with the Delta's new wetlands[14, 15]. Levee failure at Liberty Island has yielded tidal mud flats, marshes, and dead-end sloughs believed beneficial to Delta smelt[16, 17].
   b. Invert guiding principles of habitat restoration. According to guidelines proposed for the Puget Sound Nearshore Ecosystem Restoration Project[18], restoration success is to likely to increase with the size and connectivity of the restored ecosystems, and with attempts to mimic their roles at landscape scale.
4. Make analogies with inferred effects of habitat loss at other estuaries. Diking of the Columbia River's freshwater wetlands may have harmed Chinook salmon by limiting export of vascular-plant detritus[19].

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